UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/892,605	06/28/2001	Hiroyuki Sasai	2001_0928A	4838

513 7590 07/27/2005

WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

EXAMINER	
CURS, NATHAN M	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/892,605	SASAI ET AL.	
	Examiner	Art Unit	
	Nathan Curs	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6 and 8-11* is/are pending in the application.

4a) Of the above claim(s) *11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6 and 8-10* is/are rejected.

7)☒ Claim(s) *11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/28/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities: As noted in the office action of 24 January 2005, Claim 11 was withdrawn from further consideration as being drawn to a non-elected species; therefore the amendment to the claim is not considered. Further, a claim cannot have two identifiers (see 37 CFR 1.121, Appendix R of the MPEP). Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seto et al. (US Patent Application Publication No. 2003/0035183) in view of Franco et al. (US Patent Application Publication No. 2004/0190911).

Regarding claim 1, Seto et al. disclose an optical transmission system, a center station and a plurality of radio base stations each having an antenna portion and covering different service areas for bidirectional communication with subscriber terminals via radio signals (fig. 15 and paragraphs 0197-0200), wherein said center station comprises an electrical-optical conversion portion (fig. 15, element 18), receiving one or more baseband signals as one or more modulated electric signals each having a predetermined intermediate frequency, for

converting the one or more modulated electric signals into an optical signal by intensity modulation (fig. 15, element 10B and paragraphs 0200-0202), a local oscillation signal source for outputting a predetermined local oscillation signal (fig. 15, element 14-1 or 14-2 and paragraph 0200), and an optical branching portion for branching the optical signal into a plurality of optical signals, and respectively outputting the plurality of optical signals obtained by the branching to the plurality of optical fibers (fig. 15, element "optical divider"), and each of said plurality of radio base stations comprises an optical-electrical conversion portion for converting the optical signal transmitted through a respective one of the plurality of optical fibers into an electric signal in a radio frequency band (fig. 15, element "O/E conv" and paragraph 0203), and a band pass filter for extracting only an electric signal component in a desired frequency band from the electric signal obtained by the conversion in said optical-electrical conversion portion (fig. 15, element 38 and paragraph 0203), and feeding the extracted electric signal component to said antenna portion (fig. 15, element 48 and paragraph 0203). Seto et al. disclose the pilot signal added with the data signals in the electrical domain, but do not disclose an external modulation portion after the E/O conversion at the transmitting station for intensity-modulating the optical signal obtained by the E/O conversion using the predetermined local oscillation signals. Franco et al. disclose an optical modulation configuration where one modulator modulates a data signal onto an optical signal (thus converting the electrical signal to optical signal) and also externally modulating sinusoidal signals onto the optical signal (fig. 1 and paragraphs 0086-0097). It would have been obvious to one of ordinary skill in the art at the time of the invention that the second optical modulator of Franco et al. could be added to the E/O converter section of Seto et al. for adding the carrier frequency signals, and thus modifying the pilot carrier signal configuration of Seto et al. such that the electrical summation signal (Seto et al.: fig. 15, element 16 output), without the carrier signals, is converted to an optical signal and

then modulated with the pilot signals using external modulation, as taught by Franco et al., in order to provide the benefit of external modulation over direct modulation, since external modulation does not produce the transmission distance limiting signal chirp that is produced if directly modulating a laser.

Regarding claim 6, the combination of Seto et al. and Franco et al. disclose the optical transmission system according to claim 1, said radio base stations respectively use radio signals of differing frequencies (Seto et al.: paragraph 0199).

Regarding claim 10, the combination of Seto et al. and Franco et al. disclose the optical transmission system according to claim 1, wherein a semiconductor laser for converting an electric signal into an optical signal through direct modulation is used for said electrical-optical conversion portion (fig. 15, element 86 and paragraph 0200).

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seto et al. (US Patent Application Publication No. 2003/0035183) in view of Franco et al. (US Patent Application Publication No. 2004/0190911) as applied to claims 1, 6 and 10 above, and further in view of Way et al. (US Patent No. 6525857).

Regarding claim 8, the combination of Seto et al. and Franco et al. disclose the optical transmission system according to claim 1, but do not disclose that the optical signal outputted from said external modulation portion is an optical single-sideband signal with a carrier and a single-sideband component. Franco et al. disclose an optical modulation configuration where one modulator externally modulates a data signal onto an optical signal (thus converting the electrical signal to optical signal) and also externally modulating sinusoidal signals onto the optical signal, where the serial order of the two modulators is not significant (fig. 1 and paragraphs 0086-0097). It would have been obvious to one of ordinary skill in the art at the time

of the invention that an external modulator could also be used for the E/O conversion in place of the direct modulator of Seto et al., in order to provide the benefit of external modulation over direct modulation for the E/O conversion as well, since external modulation does not produce the transmission distance limiting signal chirp that is produced if directly modulating a laser. Further, Way et al. disclose an external modulator for radio transmission that produces a single sideband signal by modulating the carrier frequency using a channel signal and phase-shifted version of the channel signal (fig. 5A and col. 5, lines 38-57). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the SSB modulation technique disclosed by Way et al. for the E/O external modulator of the combination of Seto et al. and Franco et al., in order to provide the benefit of bandwidth efficiency for the multi-channel system, achieved using SSB transmission as taught by Way et al. (col. 1, lines 44-65).

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seto et al. (US Patent Application Publication No. 2003/0035183) in view of Franco et al. (US Patent Application Publication No. 2004/0190911) as applied to claims 1, 6 and 10 above, and further in view of Ooi et al. (US Patent No. 6362913).

Regarding claim 9, the combination of Seto et al. and Franco et al. disclose the optical transmission system according to claim 1, wherein said external modulation portion is a Mach-Zehnder type external modulator, but do not disclose that a bias point in the external modulator is set to a point at which light output power is a minimum or a maximum so that the optical signal is intensity-modulated by a component which is twice a frequency of the predetermined local oscillation signal. However, Ooi et al. disclose details on the conventional behavior of a mach-zehnder external modulator and disclose that when the bias of the modulator is at an optimum level, the output signal is modulated by a component that is twice the frequency of an

oscillation modulation signal (fig. 35 and col. 3, lines 42-52). It would have been obvious to one of ordinary skill in the art at the time of the invention to set the bias of the external modulator of the combination of Seto et al. and Franco et al. to the optimum value in order to produce the optimum output as taught by Ooi et al.

Response to Arguments

6. Applicant's arguments filed 25 April 2005 have been fully considered but they are not persuasive.

The applicant argues that combining the teaching of Franco with Seto would render Seto inoperative. However, perhaps the applicant misunderstands the teaching of Franco applied to Seto. As cited, Seto shows the data signals and pilot carrier signals combined in the electrical domain, and then the combined signal is converted to an optical signal (see Seto fig. 15, element 10B). Franco teaches two series Mach-Zehnder optical modulators (fig. 1; the order of the two modulators in series is irrelevant – see Franco paragraph 0096), one for modulating carrier signals and the other for modulating data (or vice versa). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the pilot carrier modulation of Seto could be modified such that the pilot signals are not combined electrically with the data signals, but rather optically modulated external to the data modulation. In other words, the data signals of Seto would still modulate the laser of Seto and then the pilot carrier signals would modulate the optical signal output from the laser using an external Mach-Zehnder modulator, based on the teaching of Franco.

The applicant also argues that Seto and Franco are non-analogous. However, the optical modulation teaching of Franco is analogous to the optical modulation portion of Seto.

The fact that Seto teaches an entire system and Franco teaches an apparatus does not make Franco non-analogous.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

8. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600